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File 51.304A

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Mandan Refinery - 1974 to 1977 Actual Sulfur Dioxide Emissions

I am responding on behalf of the Mandan Refinery regarding your letter to Dan Porter of July 3, 2001, requesting baseline sulfur dioxide emission data from the 1974 to 1977 time period. Our review indicates the 1976 emission inventory in the refinery's air pollution control permit application (APCPA) dated April 12, 1977, is the best available emission estimate data. An exception is the emission estimates for the Ultraformer furnaces. Several pages of the permit application are in Attachment 1 to this letter. We could not find emission inventories for 1974, 1975, or 1977. We believe the 1976 inventory is fairly representative of both 1976 and 1977, since crude runs and FCCU feed rates are similar (1976 being slightly higher). The sulfur dioxide emission rates are approximately 4,000 tons per year higher than present rates.

We take exception to the APCPA Ultraformer furnace emission estimates, because the calculations do not appear to account for the sulfur from the desulfurizer hydrogen sulfide stripper on the unit. Accounting for this sulfur increases the hydrogen sulfide content of the Ultraformer fuel gas to about 500 ppmv, and increases the sulfur dioxide to about 57 tons per year.

A summary of the annual, 24 hour, and 3 hour estimated emission rates are on the table below. The annual rates are based on the figures in the APCPA, with the Ultraformer emissions adjusted as described in the previous paragraph. The 24 hour rates are based on a maximum daily coke burn of 18,783 pounds per hour (page 31 of 60 in APCPA). A review of the limited operating data that could be located indicates this occurred on October 20, 1976. The three hour sulfur dioxide emission rate is based on pro-rating the maximum daily rate.

Mandan Refinery Estimated Actual Annual Emissions for 1976 & 1977	Annual	24 Hour	3 Hour
Source	Tons SO2 per Year *	Lbs SO2 per Day	Lbs SO2 per Three Hours
Boilers	2242	13800	1730
Crude Furnace	2429	14200	1780
FCC Unit	4975	29800	3730
Ultraformer Furnaces	57	270	34
Alkylation Unit Furnaces	702	2900	360
Total Sulfur Dioxide Emissions	10405	60970	7634

* Annual numbers, excepting the Ultraformer furnaces, are based on the emission inventory in the APCPA

In your letter you asked for information on the methodology and analysis in support of the emission calculations. The annual rates are generally based on data that was averaged over the year. The daily rates are based on limited daily operating data that could be found, that included daily coke burn and daily energy consumption of fuel oil and fuel gas at the boilers. Most other data is based on monthly averages or annual averages derived as shown in Attachments 2 and 3. Fuel gas flow measurement is based on refinery fuel meters, and fuel oil burn is determined by fuel tank gauging. Coke burn calculations and sulfur dioxide emissions are based on FCCU air blower flow measurement and coke analysis for weight percent sulfur. Fuel oil and gas analysis followed ASTM procedures at the time period. Gas chromatographs were used to determine fuel gas composition.

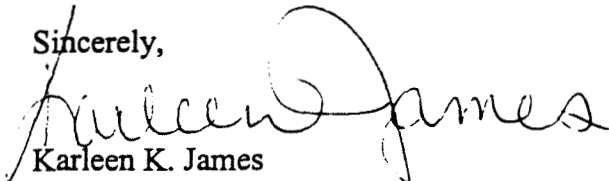
Point number four of your letter requested information concerning sulfur dioxide emissions from minor sources associated with company oil and gas wells. As Dave Schaaf discussed with Terry O'Clair, the refinery has no first hand knowledge to answer that question. BP Crude Pipeline and Exploration and Production personnel that received this letter should have the necessary first hand knowledge to address your questions.

In summary, we believe that the 1976 emission inventory in the refinery's air pollution control permit application, as adjusted in this letter, should be used to establish the refinery's estimated actual emission during the 1974 to 1977 time period. Should you

have questions concerning any of the information contained in this document, please contact Dave Schaaf at 667-2485.

We apologize for the late reply to your letter. We will take steps to improve in the future.

Sincerely,



Karleen K. James
Manager, Health, Safety & Environment

Attachments

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